IN THE CLAIMS

1. (Currently Amended) A data relocation method in a computer system comprising at least one computer for operating a database management system, at least one storage apparatus for storing database data to be managed by said database management system, storage control means connected between said computer and said storage apparatus for controlling data transfer between said computer and said storage apparatus, and a data position management server for managing the data positions in said computer system, said method comprising the steps of:

acquiring information on a database to be managed by said database management system through said computer by said data position management server;

determining by said data position management server allocation of said database data in said computer system on the basis of acquisition information including said database information;

instructing said storage control means of data migration to realize said data allocation determined by said data position management server; and

changing said data allocation stored in said storage apparatus by said storage control means according to said instruction,

wherein said information on database contains at least one of information relating to a data structure

including table, index, and log defined by a schema of said

database management system and information relating to record

positions of data of said database sorted according to the

data structure defined by said schema in said storage

apparatus.

2. (Original)   A data relocation method as set forth in claim

1, wherein said data position management server acquires

information relating to a storage position of data from said

storage control means.

3. (Original)   A data relocation method as set forth in claim

1, wherein a function of said data position management server

is realized on a computer on which said database is operated.

4. (Original)   A data relocation method as set forth in claim

1, wherein a function of said data position management server

is realized on said storage control means.

5. (Original)   A data relocation method as set forth in claim

1, wherein a function of said data position management server

is realized on said storage apparatus.

6. (Original)   A data relocation method as set forth in claim

1, wherein said storage control means is realized by a program

executed on said computer.

7. (Original) A data relocation method as set forth in claim 1, wherein, prior to instruction of the determined data allocation from said data position management server to said storage control means, said determined data allocation is presented to an administrator to check the administrator about whether or not to conduct a change in the data allocation.

8. (Canceled)

9. (Currently Amended) A data relocation method as set forth in claim 81, wherein, in said computer system having a plurality of said storage apparatuses therein, said data position management servers, at the time of determining said data allocation, determines said data allocation to be allocated to said another storage apparatus different from said storage apparatus having said data stored already therein.

10. (Currently Amended) A data relocation method as set forth in claim 81, wherein said storage apparatus has at least one physical storage means for storing data therein, and said data position management server, at the time of determining said data allocation, determines a data allocation which specify a storage position in said physical storage means of said storage apparatus.

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11. (Original) A data relocation method as set forth in claim
10, wherein said data position management server has at least
one physical storage means for storing data therein, said
storage apparatus has logical/physical position conversion
means for converting a logical position used by said computer
to access said storage apparatus to a storage position of said
physical storage means, and said data position management
server acquires information including in-storage-apparatus
logical/physical mapping information relating to mapping of
logical/physical position from the storage apparatus having
said logical/physical position conversion means.

12. (Currently Amended) A data relocation method as set forth
in claim 11, wherein at least one of the storage apparatuses
having said logical/physical position ~~con version~~conversion
means has in-storage-apparatus data physical storage position
change means for changing a storage position of data of said
physical storage means corresponding to said logical position,
said data position management server, at the time of
instructing data migration to realize said determined data
allocation, instructs said storage apparatus having said
storage-apparatus data physical storage position change means
of the data migration in said storage apparatus, and said
storage apparatus changes the allocation of said data stored
in said storage apparatus according to said instruction.

13. (Original) A data relocation method as set forth in claim 10, wherein said data position management server detects a set of said database data to be simultaneously accessed with a high possibility on the basis of said acquisition information, and arranges said set in said physical storage means different therefrom.

14. (Original) A data relocation method as set forth in claim 13, wherein said data position management server acquires information including information about an execution history of operation of said database management system.

15. (Original) A data relocation method as set forth in claim 13, wherein at least one of said storage apparatuses acquires operation information of said physical storage means in said storage apparatus, said data position management server acquires said physical storage operation information from said storage apparatus, and said acquisition information includes said physical storage operation information acquired from said storage apparatus.

16. (Original) A data relocation method as set forth in claim 13, wherein said data position management server grasps table data and index data to said table data, and when said index data is tree-structured, regards a pair of said table data and

said index data as a set of database data to be simultaneously accessed with a high possibility.

17. (Original) A data relocation method as set forth in claim 13, wherein said data position management server regards a pair of log data recorded at the time when said database management system updates said database data and other said database data as a set of database data to be simultaneously accessed with a high possibility.

18. (Original) A data relocation method as set forth in claim 10, wherein said database information includes information relating to a parallelism when said database management system accesses said database data belonging to the same data structure defined by said schema, and said data position management server arranges said database data belonging to the same data structure defined by said schema in a plurality of said physical storage means on the basis of said acquisition information.

19. (Original) A data relocation method as set forth in claim 10, wherein said data position management server judges an access location and access order at the time of sequentially accessing said database data, and arranges said database data sequentially accessed in continuous areas while keeping a relationship of said continuous access order on said physical

storage means.

20. (Currently Amended) A data relocation method as set forth in claim 8̶1, wherein said database information includes information relating to a cache memory amount and cache operation when said database management system caches said database data in a memory on said computer, said data position management server acquires storage apparatus cache memory information relating to a cache memory from said storage apparatus and allocates the data in said storage apparatus on the basis of information about a cache memory effect obtained from said database information and said storage apparatus cache memory information.

21. (Original) A computer system including at least one computer for operating said database management system, at least one storage apparatus for storing database data to be managed by said database management system, storage control means connected between said computer and said storage apparatus for controlling data transfer between said computer and said storage apparatus, and a data position management server for managing the data positions in said computer system, said data position management server comprising:

information acquisition means for acquiring information on a database to be managed by said database management system through said computer by said data position

management server;

allocation determination means for determining by said data position management server allocation of said database data in said computer system on the basis of acquisition information including said database information; and

data allocation instruction means for instructing said storage control means of data migration to realize said data allocation determined by said data position management server,

wherein said storage control means has data allocation change means for changing said data allocation stored in said storage apparatus by said storage apparatuses according to said instruction.

22. (Original) A computer system as set forth in claim 21, wherein said data position management server has data position acquisition means for acquiring information about a data storage position from said storage control means.

23. (Original) A computer system as set forth in claim 21, wherein said data position management server and a computer having said database to be operated therein make up identical said computer.

24. (Original) A computer system as set forth in claim 21,

wherein said data position management server and said storage
control means make up an identical apparatus.

25. (Original)   A computer system as set forth in claim 21,
wherein said data position management server and predetermined
said storage apparatus make up an identical apparatus.

26. (Original)   A computer system as set forth in claim 21,
wherein said storage control means is realized in the form of
a program to be executed on said computer.

27. (Original)   A computer system as set forth in claim 21,
further comprising means for presenting a data allocation
determined by said arrangement determination means to an
administrator and means for acquiring a change or no-change in
the data allocation by said administrator.

28. (Original)   A computer system as set forth in claim 21,
wherein said database information includes at least one of
information on a data structure including table, index, and
log defined by the schema of said database management system
and information on recorded positions of said database data in
said storage apparatus sorted according to the data structure
defined by said schema.

29. (Original)   A computer system as set forth in claim 28,

wherein a plurality of said storage apparatuses are provided, and said allocation determination means determines said data to be allocated to a storage apparatus different from said storage apparatus having said data already stored therein.

30. (Original) A computer system as set forth in claim 28, wherein said storage apparatus has at least one physical storage means for storing at least one piece of data, and said allocation determination means determines the data allocation which specify storage position in said physical storage means of said storage apparatus.

31. (Original) A computer system as set forth in claim 30, wherein at least one of said storage apparatuses has logical/physical position conversion means for converting a logical position to be used by said computer when accessing said storage apparatus to a storage position of said physical storage means, and said data position management server acquires information including storage-apparatus logical/physical mapping information relating to mapping of the logical position/physical position from the storage apparatus having said logical/physical position conversion means.

32. (Original) A computer system as set forth in claim 31, wherein at least one of said storage apparatuses having said

logical/physical position conversion means therein has in-storage-apparatus data physical storage position change means for changing a storage position of data of said physical storage means corresponding to said logical position, and said data position management server has storage apparatus data position instruction means for instructing the storage apparatus having said in-storage-apparatus data physical storage position change means therein of data migration to realize said data allocation.

33. (Original) A computer system as set forth in claim 30, wherein said allocation determination means detects a set of said database data to be simultaneously accessed with a high possibility on the basis of said acquisition information and allocates said detected set in said physical storage means different therefrom.

34. (Original) A computer system as set forth in claim 33, wherein said database information includes information relating to an execution history of operation of said database management system.

35. (Original) A computer system as set forth in claim 33, wherein at least one of said storage apparatuses has operation information acquisition means for acquiring operation information of said physical storage means in said storage

apparatus, said data position management server has means for acquiring said physical storage means operation information from said storage apparatus, and said acquisition information to be used by said allocation determination means includes said physical storage means operation information acquired from said storage apparatus.

36. (Original) A computer system as set forth in claim 33, wherein said allocation determination means grasps table data and index data to said table data, and regards a pair of said table data and said index data as a set of database data to be simultaneously accessed with a high possibility when said index data is tree-structured.

37. (Original) A computer system as set forth in claim 33, wherein said allocation determination means regards a pair of log data recorded at a time when said database management system updates said database data and other said database data as a set of database data to be simultaneously accessed with a high possibility.

38. (Original) A computer system as set forth in claim 30, wherein said database information includes information relating to a parallelism when the database management system accesses said database data belonging to an identical data structure defined by said schema, and said allocation

determination means arranges said database data belonging to the identical data structure defined by said schema in a plurality of said physical storage means on the basis of said acquisition information.

39. (Original) A computer system as set forth in claim 30, wherein said allocation determination means judges an access location and an access order when said database management system sequentially accesses said database data on the basis of said acquisition information, and arranges the database data to be sequentially accessed in continuous areas while keeping a relationship of said continuous access order on said physical storage means.

40. (Original) A computer system as set forth in claim 28, wherein said database information includes information relating to a cache memory amount and cache operation when said database management system caches said object data in a memory on said computer, said data position management server has means for acquiring storage apparatus cache memory information relating to a cache memory from said storage apparatus, and said allocation determination means arranges the data in said storage apparatus on the basis of information relating to a cache memory effect obtained from said database information and said storage apparatus cache memory information.

41. (Original) A data position management server connected to at least one computer for operating said database management system, to at least one storage apparatus for storing database data to be managed by said database management system and to storage control means connected between said computer and said storage apparatus for controlling data transfer between said computer and said storage apparatus, said data position management server managing the data positions in said storage apparatus, said data position management server comprising:

information acquisition means for acquiring first information on a database by said data position management server to be managed by said database management system through said computer;

data position acquisition means for acquiring second information relating to a data storage position from said storage control means;

data allocation determination means for determining a physical storage position of said database data in said storage apparatus on the basis of said first and second information; and

data allocation instruction means for instructing said storage control means of data migration to realize said data allocation determined by said data allocation determination means.

42. (Original) A data position management server as set forth
in claim 41, wherein said storage control means is implemented
by a program on said at least one computer.